



INFORMATION UPDATE—May 1991

AOSTRA-SoilTech Anaerobic Thermal Processor Treats PCBs in Soils at Wide Beach Development Superfund Site in Brant, New York

INTRODUCTION

The U.S. Environmental Protection Agency (EPA) will conduct a Superfund Innovative Technology Evaluation (SITE) demonstration as part of its ongoing cleanup efforts at the Wide Beach Development site in Brant, New York. The SITE program was created in 1986 to demonstrate and evaluate innovative treatment technologies that may have performance and cost advantages over technologies currently in use.

The SITE technology demonstration at the Wide Beach Development site will measure the effectiveness of the SoilTech Anaerobic Thermal Processor (ATP). The ATP technology involves a physical separation process that thermally desorbs organics such as polychlorinated biphenyls (PCB) from soil and sludge. The ATP process will be used in conjunction with dehalogenation to chemically destroy PCB-contaminated soils at the Wide Beach Development site. The demonstration will provide performance and cost data on the ATP process.

TECHNOLOGY DESCRIPTION

The ATP technology was developed by Alberta Oil Sands Technology and Research Authority (AOSTRA) and is licensed by SoilTech, Inc. The transportable treatment unit being used at the Wide Beach Development site is capable of processing about 10 tons of contaminated soil per hour.

The ATP system heats and mixes contaminated soils, sludges, and liquids in a special rotary kiln that uses indirect heat for processing. The kiln contains four separate internal thermal zones: the preheat, retort, combustion, and cooling zones. Before entering the preheat zone, contaminated soils are sprayed with an oil mixture containing alkaline and polyethylene glycol reagents. The oil mixture acts as a carrier for the dehalogenation reagents. In the preheat zone, water and volatile organic compounds (VOC) vaporize. At the same time, the reagents dehalogenate or chemically break down chlorinated compounds (including PCBs). The vaporized contaminants and

water are removed via vacuum to a preheat vapor cooling system consisting of a cyclone and heat exchanger. Noncondensed light organic vapors are fed by a gas blower directly into the combustion chamber of the processor. Condensed liquids are then separated. The oil fraction is recycled to a reagent blending tank, and recovered water is pretreated and sent off-site for disposal.

From the preheat zone, the hot, granular solids pass through a sand seal to the retort zone. Here heavy oils vaporize, and thermal cracking of hydrocarbons forms coke and low molecular weight gases. The vaporized contaminants are removed via vacuum to a retort gas handling system. After cyclones remove dust from the gases, the gases are cooled. Condensed oil is separated into its various fractions. Noncondensed gases are returned to the combustion chamber of the processor.

The coked soils pass through a second sand seal into the combustion zone. Here the coked soils are combusted and either recycled to the retort zone or sent to be cooled in the cooling zone. Flue gas from the combustion zone is treated in a system consisting of a cyclone and baghouse that remove particles; a scrubber that removes acid gases; and a carbon adsorption bed that removes trace organics. The treated flue gas is then discharged to the atmosphere through a stack. The combusted soils that enter the cooling zone are cooled in the annular space between the outside of the preheat and retort zones and the outer shell of the kiln. Treated soils exiting the cooling zone are quenched with scrubber water and are then transported by conveyor to an outside storage pile.

TECHNOLOGY DEMONSTRATION

The ATP process demonstration will occur in conjunction with the full-scale remediation of the Wide Beach Development site. Although SoilTech has successfully demonstrated that the ATP technology is capable of meeting the site-specific remedial objectives, EPA wishes to collect additional performance and cost data on the technology to meet the following primary demonstration objectives:

- Assess the technology's ability to remove PCBs and other organics from soil at the Wide Beach Development site.
- Determine whether polychlorinated dibenzo-p-dioxins (PCDD) or polychlorinated dibenzofurans (PCDF) are produced in the system.
- Document the operating conditions of the ATP process.
- Determine capital and operating costs on the ATP technology for use in future waste treatment decision-making processes.

The ATP technology demonstration will also meet the following secondary objectives:

- Characterize the noncondensable gases from the preheat and retort zones that are returned to the combustion zone.
- Determine the fate of chlorine in the process to the extent possible.
- Characterize the feed and treated soil so the results of the demonstration can be used as part of the Superfund decision-making processes at other sites.
- Evaluate disposal options for the treated soil and treated water.
- Determine what semivolatile organic degradation products exist in the treated soil.

Solid, liquid, and gaseous samples will be collected and analyzed to meet the objectives listed above. Solid samples will include contaminated feed soil, treated solids, retort and flue gas cyclone dust and baghouse dust, and preheat vapor cyclone dust. Liquid samples will include scrubber liquor; condensed water before treatment; condensed water after treatment; preheat vapor condensate; and retort vapor condensate. Gaseous samples will include stack gas, preheat noncondensable gas discharged to the combustion chamber, and retort noncondensable gas discharged to the combustion chamber.

The demonstration is scheduled for the week of May 20, 1991, and will last for about 1 week. Three 8-hour test runs will be conducted.

EPA has prepared a detailed demonstration plan that outlines methods and procedures for testing and evaluating the ATP technology. After the demonstration, EPA will compile and analyze the resulting data and publish it in a Technology Evaluation Report and Applications Analysis Report. Results from the demonstration may be useful in identifying remedies for similarly contaminated sites across the country.

SITE DESCRIPTION AND HISTORY

The Wide Beach Development site is a small lake-side community located in the town of Brant in Southern Erie County about 30 miles south of Buffalo, New

York. There are 60 residences in the Wide Beach community accommodating approximately 120 people in the summer months and 45 people year-round. The nearest year-round population center is the Village of Farnham located 1.25 miles east of the site. Farnham has a population of 404.

Between 1968 and 1978, the Wide Beach Homeowner's Association applied about 40,950 gallons of waste oil to Wide Beach area roadways for dust control. Some of this waste oil was contaminated with PCBs. In 1980, a sanitary sewer line was installed in the Wide Beach Development, and contaminated soils were excavated from the roadways and their vicinity. At the time, no one suspected a PCB contamination problem, and the excavated soil was used as fill in several residential yards and in a community recreation area. Approximately 30,000 tons of soil on site were eventually contaminated with PCBs. About 20,000 tons have been treated by SoilTech.

In September 1985, EPA signed a Record of Decision that selected a remedy for the site. The selected remedy called for excavating PCB-contaminated soils, chemically dehalogenating contaminated soils, using treated soils as on-site fill, and repaving roadways and driveways. In September 1988, results from treatability studies indicated that the chemical dehalogenation technology was capable of reducing PCB contamination in the soils to acceptable levels. In February 1989, the remedial design for cleaning up the site was completed. Subsequently, EPA issued a request for proposals for implementing the remedial design. In October 1989, a \$15.5 million contract for implementing the remedial design was awarded to Kimmins Thermal Corporation. In September 1990, site cleanup began. SoilTech was subsequently awarded a subcontract for soil treatment based on their proposal to use the ATP technology.

ADDITIONAL INFORMATION

For additional information about the SITE program, the Wide Beach Development or SoilTech's ATP technology, please contact:

Paul dePercin
U.S. EPA SITE Project Manager
(513) 569-7797

Herb King
U.S. EPA Remedial Project Manager
(212) 264-1129

Martin Vorum
SoilTech Project Manager
(303) 790-1747



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